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<b>(54) Title:</b> SYSTEM AND METHOD FOR GENERATING AND EXECUTING INSURANCE POLICIES FOR FOREIGN EXCHANGE LOSSES		
<b>(57) Abstract</b> <p>A system (200, 300, 400, 410, 420, 430, 440, 450, 460) and method for providing foreign exchange insurance policy (60) that automatically considers factors such as the type of currency (630), exchange rate (640), amount of coverage (660), and period of coverage (650), to determine a premium (730). Users can access the system (200, 300, 400, 410, 420, 430, 440, 450, 460) using credit cards, ATMs (440), banks (460) or other media.</p> <div data-bbox="703 1213 1365 1892"><pre>graph TD; 700[CENTRAL CONTROLLER STORES POLICY REQUIREMENTS IN POLICY REQUIREMENTS DATABASE 700] --&gt; 710[ACCESSES CURRENT EXCHANGE RATE FROM EXCHANGE RATE DATABASE 710]; 710 --&gt; 720[ACCESSES EXCHANGE RATE VOLATILITY DATA FROM EXCHANGE RATE VOLATILITY DATABASE 720]; 720 --&gt; 730[COMPUTES PREMIUM COST BASED ON POLICY REQUIREMENTS, CURRENCY EXCHANGE RATE, AND VOLATILITY 730]; 730 --&gt; 740[TRANSMITS PREMIUM AMOUNT TO END USER 740];</pre></div>		

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°       SYSTEM AND METHOD FOR GENERATING AND EXECUTING INSURANCE  
          POLICIES FOR FOREIGN EXCHANGE LOSSES

BACKGROUND OF THE INVENTION

5       The present invention relates generally to  
foreign currency exchange, and more particularly to  
generating and executing insurance policies for foreign  
exchange losses.

          Rapidly expanding global commerce and  
international travel have dramatically increased the need  
10       for foreign currency exchange. Foreign exchange rates are  
highly variable, and numerous factors influence the  
exchange rates, such as economic strength of countries,  
political stability, countries' transnational policies and  
relationships, and demand for foreign currency. Due to  
15       high variability and numerous factors influencing the  
exchange rates, it is extremely difficult to predict  
future exchange rates even for a short period.

          Due to the unpredictable nature of the exchange  
rates, individual travelers may wish to lock in a  
20       favorable exchange rate before they travel to foreign  
countries, thus eliminating the need to purchase foreign  
currencies in advance. One way to protect against  
unpredictable fluctuation of exchange rates are forward  
currency contracts. These contracts give the buyer a  
25       right to purchase a certain amount of foreign currency at  
a specific price at a specific future time. Essentially,  
the buyer of the contract pays a premium for the right to  
purchase a large block of foreign currency at a fixed  
exchange rate.

30       Unfortunately, forward currency contracts  
involve large sums of money, and thus, are practical only  
for large institutions and international companies seeking  
to minimize currency exchange risks, or commercial  
currency traders. The size of forward currency contracts  
35       generally does not vary, nor can they be shared by a group

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of individuals. Additionally, there is little or no flexibility in specifying a range of coverage because forward currency contracts must designate a specific date.

Accordingly, not only are these options restrictive, they do not offer avenues for individual consumers to hedge their personal currency risk. Instead, if individuals want to "lock in" a prevailing exchange rate, they must either purchase the foreign currency or an instrument denominated in the foreign currency, such as traveler's checks. The actual purchase, however, poses many disadvantages such as tying up funds, paying a commission, and foregoing the possibility of enjoying any favorable future fluctuations.

Therefore, it is desirable to provide a method of protecting individual consumers against unpredictable fluctuations of foreign exchange rates.

It is also desirable to offer a more flexible method for large entities to ensure against currency fluctuations.

It is further desirable to provide a method of foreign currency exchange rate protection through commonly accessible means such as credit cards or ATMs.

#### SUMMARY OF THE INVENTION

Accordingly, the present invention involves generating and executing insurance policies for foreign exchange losses that substantially obviate one or more of these limitations by automatically determining an appropriate premium, and processing transactions under the foreign exchange insurance policies.

Specifically, a method of providing a foreign exchange insurance policy consistent with this invention comprises a central controller receiving policy requirements from a user for the foreign exchange insurance policy; storing the policy requirements and the corresponding user id; accessing data corresponding to the specified currency and current market conditions;

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estimating currency volatility from the accessed data; and computing a premium cost based on the currency volatility. The received policy requirements further include the specified currency, exchange rate, amount of coverage, and a period of coverage.

According to another aspect of the present invention, a system for providing a foreign exchange insurance policy consistent with this invention comprises receiving means, a database, accessing means, estimating means, and computing means. The receiving means receives policy requirements from a user for the foreign exchange insurance policy, including a user id, a specified currency, exchange rate, amount of coverage, and a period of coverage. The database stores the policy requirements and the corresponding user id. The accessing means access data including historic exchange rates corresponding to the specified currency and current market conditions. The estimating means estimates currency volatility from the accessed data. Finally, the computing means computes a premium cost based on the currency volatility.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate the invention and together with the description, serve to explain the principles of the invention.

Fig. 1 is a block diagram of a system consistent with the present invention;

Fig. 2 is a detailed block diagram of the central controller in Fig. 1;

Fig. 2A-2C are tables illustrating the data structure of the databases;

Fig. 3 is a block diagram of another system consistent with the present invention using credit cards;

Fig. 4 is a block diagram of yet another system consistent with the present invention using automatic

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° teller machines (ATMs);

Fig. 5 is a block diagram of still another system consistent with the present invention using banks;

Fig. 6 is a flowchart illustrating a preferred process for selecting policy requirements;

5 Fig. 7 is a flowchart illustrating a preferred process for calculating an insurance premium;

Fig. 8 is a flowchart illustrating a preferred process for creating the insurance premium for the user;

10 Fig. 9 is a flowchart illustrating a preferred process for system maintenance of active insurance policies;

Fig. 10 is a flowchart illustrating a preferred process for transmitting transaction data using credit cards;

15 Fig. 11 is a flowchart illustrating a preferred process for determining whether an insurance adjustment is necessary for the process of Fig. 10;

Fig. 12 is a flowchart illustrating a preferred process for calculating the amount of the insurance  
20 adjustment;

Fig. 13 is a flowchart illustrating a preferred process for transmitting transaction data using ATMs;

Fig. 14 is a flowchart illustrating a preferred process for determining whether an insurance adjustment is  
25 necessary for the process of Fig. 13;

Fig. 15 is a flowchart illustrating a preferred process for calculating the amount of the insurance adjustment for the process of Fig. 13;

Fig. 16 is a flowchart illustrating a preferred  
30 process for transmitting transaction data using banks;

Fig. 17 is a flowchart illustrating a preferred process for determining whether an insurance adjustment is necessary for the process of Fig. 16;

Fig. 18 is a flowchart illustrating an  
35 authentication procedure using symmetric key protocols;

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° and

Fig. 19 is a flowchart illustrating an authentication procedure using public key protocols.

DETAILED DESCRIPTION

5 Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings.

**System Architecture**

As shown in Fig. 1, a system consistent with the present invention includes a central controller 200, an  
10 end-user interface 300, and a transaction interface 400. The elements preferably connect to each other via a public switched telephone network. Alternatively, the system elements may be connected by dedicated data lines, cellular, Personal Communication Systems ("PCS"),  
15 microwave, satellite networks, Internet, or any other suitable form of data communications. Policy requirements 50, insurance policy 60, and transaction data 70 travel through these connections.

Fig. 2 shows a detailed block diagram of central  
20 controller 200 shown in Fig. 1. Central controller 200 preferably includes a central processor unit (CPU) 205, a cryptographic processor 210, a random access memory (RAM) 215, a read-only memory (ROM) 220, an Interactive Voice Response Unit (IVRU) 225, a payment processor 230, a clock  
25 235, an operating system 240, a network interface 245, and a data storage device 250. All of these elements are connected to CPU 205 to facilitate communication between them.

Central controller 200 operates as a primary  
30 server, both receiving and transmitting communications with end-user interface 300 and transaction interface 400. Central controller 200 is preferably capable of high volume processing, performing a significant number of mathematical calculations in processing communications and  
35 database searches. Central controller 200 may be a

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° conventional personal computer or a computer workstation with sufficient memory and processing capability. For example, a Pentium® microprocessor such as the 100 MHZ P54C, commonly manufactured by Intel, Inc., may be used for CPU 205. This processor employs a 32-bit  
5 architecture. Equivalent processors include the Motorola 120 MHZ PowerPC 604 or Sun Microsystem's 166 MHZ UltraSPARC-I.

Cryptographic processor 210 supports the encoding and decoding of communications as well as the  
10 authentication of transactions. A MC68HC16 microcontroller, commonly manufactured by Motorola, Inc., may be used for cryptographic processor 210. This microcontroller uses a 16-bit multiply-and-accumulate instruction in a 16 MHZ configuration and requires less  
15 than one second to perform a 512-bit RSA private key operation. One skilled in the art may easily substitute other commercially available, specialized cryptographic processors such as VLSI Technology's 33MHZ 6868 or Semaphore Communications' 40 MHZ Roadrunner284.  
20 Alternatively, cryptographic processor 210 may be configured as part of CPU 205.

Operating system 240 comprises a conventional operating system such as DOS, Windows, or OS2.

Payment processor 230 supports the transfer and  
25 exchange of payments, charges, or debits. Exemplary services operable on payment processor 320 include on-line credit authorizations, credit card settlement, payments to transaction networks, and payment aggregation. Commercially available software, such as the Secure  
30 Webserver manufactured by Open Market, Inc., may support credit card transaction processing of payment processor 230. This server software transmits credit card numbers electronically over the Internet to servers located at the Open Market headquarters, which handles card verification  
35 and processing. The Open Market's Integrated Commerce



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Service provides back-office services necessary to run Web-based businesses. Payment processor 230 preferably comprises a microprocessor (such as the Intel Pentium®), but alternatively may be configured as part of CPU 205.

Operating system 240 comprises a conventional operating system such as DOS, Windows, or OS2.

Data storage device 250 may include a hard magnetic disk, optical storage units, CD-ROM drives, or flash memory. Data storage device 250 contains databases used in processing transactions in the present invention, including an end-user database 255, a policy requirements database 260, an insurance policy database 265, a transaction data database 270, an exchange rate database 275, an exchange rate volatility database 280, a payment database 285, an end-user account database 290, and cryptographic key database 295. In a preferred embodiment, database software such as Oracle7, manufactured by Oracle Corporation, creates and manages these databases.

End-user database 255 maintains data about end users and, in one embodiment, includes fields such as name, address, credit card number, phone number, ID number, social security number, electronic mail address, and public/private key information. This information is preferably obtained when the end user first generates insurance policy 60 on the system. End-user database 255 also contains the tracking number of each insurance policy 60 generated by the end user.

As shown in Fig. 2A, policy requirements database 260 maintains data on policy requirements generated by the end user, and preferably includes fields such as end-user ID, credit card number, currency selected, exchange rate, start date of coverage, end date of coverage, and amount of coverage, and policy requirements tracking number.

As shown in Fig. 2B, insurance policy database

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265 tracks each insurance policy 60 generated by end users, and preferably includes fields such as end-user ID number, insurance policy 60, tracking number, date generated, policy requirements tracking number, and status of premium payment. Each insurance policy 60 may have an associated status of insurance policy 60 such as "active," "pending," or "expired."

As shown in Fig. 2C, transaction data database 270 stores all transaction data relating to insurance policy 60. This database is indexed by the tracking number of insurance policy 60, and preferably contains fields such as end-user ID number, amount of transaction, date of transaction, prevailing exchange rate, and bank ID number.

Exchange rate database 275 facilitates the processing of transaction data 70 by storing current and historic exchange rates for every country. The current exchange rate may be updated hourly or continuously, but preferably automatically via financial networks transacting interbank foreign exchanges.

Exchange rate volatility database 280 stores historical volatility data corresponding to each currency. This data may include past exchange rates, as well as the standard deviation of the rates over a given period of time.

Payment database 285 tracks premium payments by end users, payments to merchants or banks, and payment of claims for insurance policy 60, which contains fields such as end-user name, end-user ID number, credit card number, amount of payment, and date of payment. This database may also store the user's bank account information.

End-user account database 290 allows central controller 200 to track amounts owed to the end user under claims against insurance policy 60.

Finally, cryptographic key database 295 contains algorithms and keys for encrypting, decrypting, and

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° authenticating communications.

Network interface 245 provides the gateway to communication with transaction networks and financial data providers supplying current exchange rate information. Conventional internal or external modems may serve as  
5 network interface 245. Network interface 245 preferably supports modems at a range of baud rates from 1200bps upward, but may combine such inputs into a T1 or T3 line if more bandwidth is required. In a preferred embodiment, network interface 245 is connected with the Internet or  
10 private data network.

IVRU 225 allows end users to communicate with central controller 200 via telephone. The user can therefore enter policy requirements 50 via touch-tone keys of the end user's telephone.

15 In another embodiment, central controller 200 is configured in a distributed architecture, wherein the databases and processors are housed in separate units or locations. Some controllers perform primary processing functions and contain at a minimum, a RAM, a ROM, and a  
20 general processor. Each of these controllers is attached to a wide-area network (WAN) hub that serves as a primary communication link with the other controllers and terminals. The WAN hub may have minimal processing capability itself, serving primarily as a communications  
25 router.

In an exemplary embodiment, end-user interface 300 is a conventional telephone, capable of communicating with central controller 200 via a public switched telephone network. Conventional cellular phones or PCS  
30 devices would work equally well.

Alternatively, end-user interface 300 includes a conventional personal computer having an input device, such as a keyboard, a mouse, or a conventional voice recognition software package; a display device, such as a  
35 video monitor; a processing device, such as a CPU; and a

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° network interface, such as a modem. This configuration allows the end user to communicate with central controller 200 using any one of commercial on-line services such as America Online, CompuServe, or Prodigy, allowing end user access to central controller 200 from a wide range of electronic connections.

Communications from end-user interface 300 are preferably software driven. Many commercial software applications, whose primary functions are message creation and transmission, can facilitate communications of end-user interface 300. Eudora Pro manufactured by Qualcomm Incorporated, for example, provides editing tools to create messages as well as communications tools to route messages to the appropriate electronic address. If central controller 200 is configured as a Web server, conventional communications software, such as Navigator<sup>®</sup> from Netscape Corporation may also be used. The end user may use Netscape's Navigator<sup>®</sup> browser to transmit policy requirements 50. Transaction interface 400 transmits transaction data 70 from the end user to central controller 200 for processing. The structure of transaction interface 400 depends on the type of transactions.

Figs. 3-5 illustrate three different ways of further implementing the system in Fig. 1. Fig. 3 illustrates a credit card implementation of the present invention. Transaction data 70 flows from a credit card reader 410, to a credit card processing network 420, then to a credit card clearinghouse 430, and finally to central controller 200. These transactions are described in more detail below in connection with Figs. 6-12.

Fig. 4 illustrates an automated teller machine (ATM) implementation of the present invention in which the end user withdraws money from an ATM. In this embodiment, the end user enters transaction data 70 into an ATM 440, which then transmits the data to an ATM network 450, and

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° finally to central controller 200. This embodiment is described in more detail in connection with Figs. 13-15.

Fig. 5 illustrates a bank implementation of the present invention in which the end user seeks to exchange currency at a bank or other financial institution. After  
5 providing transaction data 70 to a bank 460, bank 460 relays the information to central controller 200 using a conventional telephone or electronic network. This embodiment is described in more detail in connection with Figs. 16 and 17.

#### 10 Credit Card Implementation

In the credit card embodiment of the present invention shown in Fig. 3, policy requirements 50 and insurance policy 60 are transmitted over a phone line, while insured transactions occur through the use of a  
15 conventional credit card.

Fig. 6 illustrates a preferred process for the end user to select policy requirements 50 (Fig. 1). Policy requirements 50 describe parameters for insurance policy 60, and reflect the insurance needs of the end  
20 user. Initially, the end user calls central controller 200 using a conventional telephone, establishing a communication link through a public switched telephone network (step 600). The end user may speak to an operator or enter the information into IVRU 225.

25 Central controller 200 processes information provided in steps 610 through 660 described below, as policy requirements 50. First, the end user provides his or her name or a unique ID number (step 610). Central controller 200 either receives this ID number from the end  
30 user, or assigns a number to the end user. Central controller 200 maintains a database of end user ID numbers in end-user database 255, and assigns (or allows) only unique numbers. If minimal security is required, the user's telephone number may serve as the ID number since  
35 it is unique and easy to remember. If additional security

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is required, authentication procedures, described hereinafter in the cryptographic authentication section may be implemented.

The end user provides a credit card number designated under insurance policy 60 (step 620), and then  
5 selects the foreign currency for insurance coverage, such as the French Franc or German Deutchmark (step 630). For alternative implementations, the credit card number of step 620 may be replaced with any other financial account numbers of the end user. For some currencies, additional  
10 information is necessary to indicate which of several exchange rates apply. In some countries, for example, the exchange rate is more favorable for local residents than for tourists.

The end user then selects the "locked-in"  
15 exchange rate (step 640). For example, if the current market rate for French Francs is five per dollar, the end user may select five to one as his insured exchange rate. The end user may lock in at any rate and the premium cost is computed accordingly. Insurance policy 60 will later  
20 compensate the end user for any transaction executed during a coverage period if the prevailing exchange rate at the time of transaction is less favorable than the locked-in exchange rate of five French Francs per dollar. This protects the end user against an unfavorable  
25 fluctuation of currency exchange rate.

Next, the end user selects start and end dates of coverage (step 650). These dates may correspond with personal or business travel dates of the end user. Transactions occurring either before the start date or  
30 after the end date are not covered by insurance policy. For example, policy requirement 50 of a business traveler on a two week trip may require a start date of July 5, 1996 and an end date of July 19, 1996. The end user also selects the desired amount of coverage, preferably in  
35 domestic currency.

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0 In the above example, the end user selects two thousand dollars of coverage, ensuring protection for two thousand dollars' worth of transactions at the locked-in rate. Transactions may, for example, include credit card payments for hotels and restaurants. After spending  
5 Francs equivalent of two thousand dollars at the locked-in rate, the end user is subject to the prevailing exchange rate and no longer enjoys the locked-in rate for future transactions.

10 Fig. 7 is a flowchart illustrating a preferred process for calculating a premium cost. First, central controller 200 stores policy requirements 50 received from the end user, along with the end-user ID number, in policy requirements database 260 (step 700). CPU 205 accesses  
15 exchange rate database 275 for the current exchange rate of the currency designated in policy requirements 50 (step 710). This exchange rate is preferably the current interbank rate, which serves as the basis of most global foreign exchange transactions. CPU 205 then accesses  
20 exchange rate volatility database 280 for exchange rate volatility data (step 720). Currencies with large volatilities, expressed in terms of standard deviations over a fixed period of time, require a large premium cost due to a greater risk of exchange rate fluctuation.

25 A premium cost is calculated based on policy requirements 50, the current exchange rate, and exchange rate volatility data (step 730). Therefore, insurance for more volatile currencies requires higher premiums. Also, a coverage period having a start date far from the current date will also necessitate a higher premium as the effect  
30 of volatility is magnified over long periods of time. For example, policy requirements 50, indicating two days of coverage beginning five days from today, has a lower premium than the same policy beginning sixty days from now. Additionally, a longer coverage period requires a  
35 higher premium. The premium is also directly related to

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° the amount of coverage. Policy requirements 50 specifying a locked-in rate that is below current spot exchange rates, however, lowers premium cost because a greater amount of fluctuation may occur before the coverage begins to take effect, thus, reducing the risk to the policy  
5 provider. Therefore, the premium cost is a function of policy requirements 50, current exchange rate, and exchange rate volatility. Once calculated, the premium cost is transmitted to the end user (step 740).

10 Fig. 8 is a flowchart illustrating a preferred process for creating insurance policy 60. The end user evaluates the premium cost transmitted by central controller 200 to decide whether the premium is acceptable (step 800). If the premium is not acceptable to the end user, the end user may develop new policy requirements 50  
15 (step 820). For example, if the premium is too high, the user may lower the amount of coverage or change the period of coverage. Central controller 200 then calculates a new premium based on the modified policy requirements 50 (step 825), as described in connection with Fig. 7.

20 If the premium is acceptable to the end user (step 810), the user transmits an acceptance to central controller 200, providing confirmation over the phone or other communication channels such as electronic mail, postal mail, or pager (step 830). To bill the user for  
25 the premium, central controller 200 may directly debit the user's credit card account or send a separate bill to the user. Next, central controller 200 generates a tracking number and appends it to insurance policy 60 (step 840), and transmits this tracking number to the end user as a  
30 confirmation of insurance policy 60 (step 850). If the user desires, central controller 200 also transmits the details of insurance policy 60 to the end user.

At this point, central controller 200 assigns a "pending" status to the newly created insurance policy 60  
35 (step 855). Central controller 200 stores insurance



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° policy 60 in insurance policy database 265 along with its corresponding status (step 860). Later, if the end user satisfies a credit approval process or pays the premium, central controller 200 changes the "pending" status of insurance policy 60 to an "active" status.

5 Central controller 200 also performs maintenance checks to ensure that only active insurance policy 60 is stored in insurance policy database 265. Fig. 9 is a flowchart illustrating a preferred process for maintaining active insurance policy 60 (Fig. 1). First, central  
10 controller 200 makes periodic searches through insurance policy database 265, retrieving the end date of each insurance policy 60 as well as the credit card number (step 900). CPU 205 compares the end date of policy 60 with the current date (step 910).

15 If the current date is later than the end date of insurance policy 60, central controller 200 changes the status of insurance policy 60 to "expired" (step 920). Database records for "expired" insurance policies 60 may be deleted from insurance policy database 265 once all  
20 claims have been settled with the end user or stored in an audit database for subsequent reference. Additionally, payment processor 230 checks to see whether the credit card number is still valid by contacting a credit card clearinghouse (step 930). If the card number is no longer  
25 valid, the status of insurance policy 60 is changed to "expired" (step 940). Otherwise, insurance policy 60 maintenance process is complete (step 950).

Once an active insurance policy 60 is stored in insurance policy database 265, the end-user may execute  
30 transactions under insurance policy 60. Fig. 10 is a flowchart illustrating a preferred process for generating transaction data 70 (Fig. 3). As the end user executes foreign currency transactions with the credit card, the data is transmitted to central controller 200 for  
35 processing. First, the end user makes a credit card

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° purchase with the credit card designated in insurance policy 60 (step 1000). For example, the end user buys a bottle of wine in France, providing the merchant the credit card data. The merchant sends transaction data 70, which is the credit card data and the purchase amount, to  
5 credit card processing network 420 (step 1010).

The merchant may swipe the credit card through credit card reader 410 to extract credit card information from the magnetic strip on the back of the card, or use some equivalent resource. The merchant then enters the  
10 amount of the transaction into a numeric keypad of credit card reader 410. Credit card reader 410, connected to credit card processing network 420 over a dedicated communication line, electronically transmits transaction data 70, and sends transaction data 70 to credit card  
15 clearinghouse 430 (step 1020). Credit card clearinghouse 430, operated by the member banks, functions as a consolidator of credit card transactions, and sends transaction data 70 to central controller 200 in real time or in a batch process (step 1030).

20 After central controller 200 receives transaction data 70, it processes transaction data 70 under insurance policy 60. Fig. 11 is a flowchart illustrating a preferred process for determining whether an insurance adjustment 80 (Fig. 3) is necessary. First,  
25 central controller 200 searches insurance policy database 265 for the credit card number associated with each transaction data 70 received from credit card clearinghouse 430 (step 1100). If the credit card number is not found in insurance policy database 265 (step 1110),  
30 no insurance adjustment 80 is necessary because the end user does not have an active policy (step 1120).

If the credit card number is found in insurance policy database 265, the exchange rate associated with transaction data 70 is compared with the locked-in rate  
35 specified in insurance policy 60 (step 1130). The

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° exchange rate associated with transaction data 70 is the prevailing spot exchange rate at the time of the transaction. This prevailing exchange rate is retrieved from exchange rate database 270. CPU 205 calculates whether the locked-in rate is more favorable than the prevailing rate on the day of transaction (step 1140).  
5 For example, if the locked-in rate is five Francs per dollar and the prevailing spot rate on the day of the transaction is six Francs per dollar, then the prevailing rate is more favorable. If the prevailing rate is more favorable than the locked-in rate, insurance adjustment 80  
10 is not necessary (step 1150).

If the rate received by the end user is less favorable than the locked-in rate, CPU 205 checks insurance policy database 265 to determine whether the coverage amount has already been used up (step 1160).  
15 If the coverage has been used up, insurance adjustment 80 is not necessary (step 1170). For example, insurance policy 60 with a two thousand dollar coverage does not cover insurance adjustment 80 for any transaction beyond the two  
20 thousand dollars. If the coverage is not exhausted, insurance adjustment 80 is necessary (step 1180).

Fig. 12 is a flowchart illustrating a preferred process for calculating the amount of insurance adjustment 80. First, central controller 200 calculates the amount  
25 of the transaction in domestic currency using the locked-in exchange rate (step 1200). For example, a traveler paying one thousand francs for a hotel room with a locked-in exchange rate of five francs per dollar would have a transaction amount of two hundred dollars.

30 Next, central controller 200 calculates the transaction amount in domestic currency using the prevailing exchange rate on the day transaction data 70 is received by central controller 200. For example, if the prevailing exchange rate is four francs per dollar when  
35 the traveler pays for his hotel room, the cost in dollars

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° would be two hundred and fifty. The differential between the two amounts is determined by subtracting the transaction amount at the prevailing rate from the transaction amount at the locked-in rate (step 1220). In the above example, the differential is fifty dollars.

5 This represents a loss to the traveler due to the drop in exchange rates from five francs to four francs per dollar.

Finally, insurance adjustment 80 is determined by computing the differential corresponding to the remaining amount of coverage under insurance policy 60.

10 For example, if the traveler has only one hundred dollars of coverage remaining, the differential of fifty dollars is halved to reflect that only half of the two hundred dollar purchase transaction is covered, and the end user is only entitled to insurance adjustment 80 of twenty five  
15 dollars. If the end user has a remaining coverage greater than the purchase amount at the locked-in rate, then insurance adjustment 80 is equal to the computed differential. Insurance adjustment 80 is transmitted to the issuing bank of the credit card (step 1230), or stored  
20 in end-user account database 290 for later processing until the coverage of insurance policy 60 expires or is used up. Insurance adjustment 80 appears as a credit on the monthly credit card statement of the end user (step 1240). Central controller 200 also updates the remaining  
25 amount of coverage in end-user account database 290 (step 1250).

#### **ATM Implementation**

The end user can also enjoy a locked-in exchange rate for cash withdrawals from ATMs abroad. The procedure  
30 establishing insurance policy 60 is identical to that described above in connection with Figs. 6-8.

Fig. 13 is a flowchart illustrating a preferred process for generating transaction data 70 when the end user withdraws money from an ATM. The end user requests  
35 foreign currency from ATM 440 (step 1300). Using the

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°  
numeric keypad of ATM 440, the end user enters the amount of the transaction (step 1310). A traveler in France, for example, withdraws one thousand francs from ATM 440. If the user wants to use the locked-in rate of insurance policy 60, the traveler enters the tracking number of insurance policy 60 into ATM 440 (step 1320). In addition to the amount of withdrawal and tracking number, transaction data 70 includes, for example, the end user's PIN number, the current date, and an ATM identification number. ATM 440 sends transaction data 70 to ATM network 450 using the dedicated communication line of ATM 440. ATM network 450 relays transaction data 70 to central controller 200 for processing, waiting for a transmission from central controller 200 to provide the appropriate exchange rate (step 1330).

15               To obtain the appropriate exchange rate, central controller 200 determines whether an insurance adjustment is necessary when the end user withdraws money from an ATM. Referring to Fig. 14, central controller 200 searches insurance policy database 265 for the tracking number received from ATM network 450 (step 1400). If central controller 200 does not find the tracking number in insurance policy database 265 (step 1410), central controller 200 transmits a message to ATM network 450, instructing ATM 440 to issue the cash at the prevailing rate (step 1420).

25               If the tracking number is found, central controller 200 compares the prevailing exchange rate to the locked-in exchange rate of insurance policy 60 (step 1430). If the exchange rate specified in insurance policy 60 is not more favorable than the prevailing rate (step 1440), ATM 440 is instructed (through ATM network 450) to pay the end user at the prevailing exchange rate (step 1450). This prevents the end user from invoking a claim under insurance policy 60 if the prevailing exchange rate is less favorable or equal to the prevailing rate.

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0           If the locked-in exchange rate is more favorable  
than the prevailing rate, however, central controller 200  
accesses end- user account database 290 to check the  
remaining coverage amount (step 1460). If the coverage  
has been exhausted, ATM 440 is once again instructed to  
5       pay the end user at the prevailing exchange rate (step  
1470). If coverage remains, however, central controller  
200 determines that insurance adjustment 80 is necessary  
(step 1480).

10           After central controller 200 determines that  
insurance adjustment 80 is necessary, it calculates the  
amount of insurance adjustment 80 as shown in Fig. 15.  
First, central controller 200 determines the remaining  
amount of coverage (step 1500). Central controller 200  
then calculates the foreign exchange differential. In  
15       doing so, central controller 200 calculates the amount to  
be withdrawn in dollars at the locked-in rate (step 1510).  
The amount of withdrawal is also calculated in dollars  
using the prevailing rate at the time of the withdrawal.  
Central controller 200 obtains the amount of insurance  
20       adjustment 80 as described above in connection with Fig.  
14 (step 1520), and updates the remaining amount of  
coverage in end-user account database 290 (step 1530).

          Central controller 200 instructs ATM 440 to  
present the end user with currencies at the locked-in  
25       exchange rate of insurance policy 60 (step 1540). In  
order to compensate the bank operating ATM 440 for the  
exchange rate loss associated with the transaction,  
central controller 200 electronically transfers the amount  
of currency equal to insurance adjustment 80 to the bank  
30       (step 1550).

          In an alternative embodiment, the end user's  
bank transmits the electronic compensation to the bank  
operating ATM 440. Central controller 200 later  
reimburses the end user's bank for the amount of insurance  
35       adjustment 80.

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### Bank Implementation

In another embodiment of the present invention, the end user enjoys a locked-in exchange rate for currency exchanges at a bank. The procedure establishing insurance policy 60 is described above in connection with Figs. 6-8.

Fig. 16 is a flowchart illustrating a preferred process for generating transaction data 70 by the end user exchanging money at a bank. The end user requests currency exchange at a foreign bank (step 1600), and specifies the amount of transaction (step 1610). For example, a tourist may exchange two hundred dollars into francs.

The end user then provides the tracking number of insurance policy 60 (step 1620), enabling bank 460 to verify the exchange rate that the end user demands. Next, bank 460 calls central controller 200 using a conventional telephone (step 1630), and provides transaction data 70 such as end user name, insurance policy 60 tracking number, amount of currency to be exchanged, current exchange rate, and a bank identification number. Bank 460 enters transaction data 70 using a touch-tone telephone or by speaking with an agent (step 1640).

Fig. 17 is a flowchart illustrating a preferred process for determining whether insurance adjustment 80 is necessary. Central controller 200 processes transaction data 70. Central controller 200 searches insurance policy database 265 for the tracking number transmitted by bank 460 (step 1700). If central controller 200 does not find the tracking number in insurance policy database 265 (step 1710), central controller 200 instructs bank 460 to exchange the end user's money at the prevailing exchange rate (step 1720). If the tracking number is found, then the exchange rate provided by bank 460 is compared to the locked-in exchange rate specified in insurance policy 60 (step 1730). If the locked-in rate is not more favorable (step 1740), then central controller 200 instructs bank

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460 to exchange the end user's money at the prevailing exchange rate (step 1750). If the locked-in rate is more favorable, central controller 200 checks the remaining amount of coverage (step 1760). If no coverage remains, central controller 200 instructs bank 460 to exchange the end user's money at the prevailing exchange rate (step 1770). If the coverage is not exhausted, however, insurance adjustment 80 is required (step 1780). Central controller 200 then calculates the amount of insurance adjustment 80 as described above in connection with Fig. 15, and updates the remaining coverage amount in end user account 240.

#### **Offline Implementation**

All the implementations described above use transaction data 70 transmitted to central controller 200 over electronic networks. The present invention, however, may also employ off-line methods for submitting transaction data 70.

For example, a business traveler on a two week trip in Germany could collect receipts for all of his transactions. Upon returning from the trip, the traveler may mail these receipts to a person who enters the data into central controller 200, which then processes the transaction as described above. Any insurance adjustment 80 required may be mailed to the end user.

#### **Internet Implementation**

Creation of insurance policy 60 and processing of transaction data 70 can also take place over an electronic network such as the Internet or a commercial online service provider like America Online or CompuServe. The end user logs on to central controller 200 using a personal computer as end-user interface 300. The procedure establishing insurance policy 60 is similar to that described above in connection with Figs. 6-8. The end user is then able to provide the tracking number as proof of insurance for any electronic commerce conducted



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° on the Internet.

For example, the end user accesses a Web site and purchases tickets (denominated in French francs) for an opera in France. The end user provides the credit card number and the tracking number, and the Web site verifies insurance policy 60 with central controller 200. Once  
5 verified, the Web site provides the tickets at the locked-in rate specified by insurance policy 60 and receives compensation from central controller 200 for the amount of insurance adjustment 80.

10 Insurance policy 60 tracking number can also be used in the conversion of digital cash from one currency to another. The end user provides a quantity of digital cash to be converted along with the tracking number of insurance policy 60 to an online bank offering foreign  
15 exchange. The bank verifies the validity of insurance policy 60 with central controller 200, and accesses the locked-in exchange rate of insurance policy 60. Assuming the locked-in rate is more favorable and sufficient amount of coverage remains, the bank completes the conversion of  
20 funds at the locked-in exchange rate, electronically transferring the new currency back to the end user for storage at end-user interface 300.

Alternatively, this digital money could be transferred to a stored value card, such as a smart card,  
25 so the end-user can use the money for transactions away from end-user interface 300. The practice of using digital cash protocols to affect payment is well known in the art and need not be described here in detail. For reference, one of ordinary skill in the art may refer to Daniel C.  
30 Lynch and Leslie Lundquist, Digital Money, John Wiley & Sons (1996); or Seth Godin, Presenting Digital Cash (1995).

Central controller 200 can also create a digital code incorporating all of the information in insurance  
35 policy 60. This digital code is encrypted with a private

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key of central controller 200 and transmitted to the end user. The end user presents this digital code to a bank along with a request for currency exchange. The bank decrypts the digital code with the public key of central controller 200 and extracts all of the details of insurance policy 60, allowing the bank access to the locked-in exchange rate without having to contact central controller 200. The bank is assured that the digital code is legitimate because only central controller 200 has access to the private key that originally encrypted the digital code.

This digital code may also be stored in a smart card. In that case, the end user need only swipe the card through a smart card reader to provide the digital code.

#### **Cryptographic Authentication**

The system can also provide additional security measures to ensure the integrity of data communications. One protocol is authenticating authorship of end user communications, *i.e.*, checking an attached ID or name and comparing it with those stored in end-user database 255. Additionally, cryptographic protocols may be added to the authentication process. These protocols enhance the ability to authenticate the sender of a message and verify the integrity of the communication itself, proving that it has not been altered during transmission. Encryption can also prevent eavesdroppers from learning the contents of the communication. Such techniques shall be referred generally as cryptographic assurance methods and will include the use of both symmetric and asymmetric keys as well as digital signatures and hash algorithms.

The practice of using cryptographic protocols to ensure the authenticity of senders as well as the integrity of communications is well known in the art and need not be described here in detail. Any conventional cryptographic protocols such as those described in Bruce Schneier, Applied Cryptography, Protocols, Algorithms, and

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° Source Code In C (2d ed. 1996), could be used in accordance with the present invention.

Fig. 18 is a flowchart illustrating an exemplary authentication procedure using symmetric key protocols in which the end user and central controller 200 share a key. Thus, both encryption and decryption of end user communications are performed with the same key. This encryption may be implemented with an algorithm such as DES (U.S. Government standard, specified in FIPS PUB 46), or with any of several algorithms known in the art such as IDEA, Blowfish, RC4, RC2, and SAFER.

The end user encrypts communications with an assigned symmetric key (step 1800), using cryptographic processor 210 of end-user interface 300. The end user communication is then transmitted to cryptographic processor 210 of central controller 200 (step 1810). Cryptographic processor 210 extracts the end-user ID from the end-user communication (step 1820), looks up the symmetric key of the end user in cryptographic key database 295 (step 1830), and decrypts end-user communications with this key (step 1840). Cryptographic key database 295 contains algorithms and keys for encrypting, decrypting and/or authenticating communications. If the resulting communication is intelligible, then it is determined to have been encrypted by the same key, thus authenticating the end user as the author of the message (step 1850).

This procedure makes it difficult for unauthorized end users to represent themselves as legitimate end users. Without cryptographic procedures, an unauthorized end user who obtained a sample communication from a legitimate end user may be able to extract the end-user ID and then attach this ID number to unauthorized communications. When end user communications are encrypted with a symmetric key, however, an unauthorized end user obtaining a sample end user

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communication only discovers the end user's ID number, not the symmetric key. Without this key, the unauthorized end user cannot create an end-user communication that will fool central controller 200, since the unauthorized end user cannot encrypt the communication the same way as the authorized end user. The symmetric key protocol also ensures that the end-user communication has not been tampered with during transmission because alteration of the communication requires knowledge of the symmetric key. An encrypted end-user communication provides the end user with greater anonymity.

Fig. 19 is a flowchart illustrating an exemplary asymmetric key protocol in which the end-user communication is encrypted with a private key and decrypted with a public key. Two such algorithms for asymmetric key protocols are RSA and DSA. The end user encrypts the communication with a private key using the cryptographic processor of end-user interface 300 (step 1900), and transmits communication to central controller 200 (step 1910). Cryptographic processor 210 extracts the end-user ID (step 1920), and looks up the end user's associated public key in cryptographic key database 295 (step 1930), and decrypts the communication with this public key (step 1940). As before, if the communication is intelligible then central controller 200 has authenticated the end user (step 1950). Again, unauthorized end users obtaining the communication before it is received by central controller 200 are unable to alter it undetectably since the intruders do not know the private key of the end user. Unauthorized end users may, however, be able to read the message if they obtain the public key of the end user. Communication secrecy is preserved if the end user encrypts the communication with the public key, requiring the intruder to know the end user's private key to view the communication.

#### CONCLUSION

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°           The present invention provides foreign exchange insurance policies to individuals as well as large corporate entities and offers protection against unpredictable foreign exchange rate fluctuations. Additionally, the present invention provides a way of  
5 automatically processing transactions covered by the foreign exchange insurance policies.

          It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention and in construction of the invention  
10 without departing from the scope or spirit of the invention. Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification and examples should be  
15 considered as exemplary only, with the true scope and spirit of the invention indicated by the following claims.

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WHAT IS CLAIMED IS:

1. A method of providing a foreign exchange insurance policy comprising the steps, performed by a data processor, of:
  - receiving from a user policy requirements for  
5 the foreign exchange insurance policy, the policy requirements including a user ID;
  - storing the policy requirements and the corresponding user ID;
  - accessing data corresponding to the specified  
10 currency and current market conditions;
  - estimating currency volatility from the accessed data; and
  - determining a premium cost based on the currency volatility.
- 15 2. The method of claim 1 further including the step of  
  - issuing a tracking code for the foreign exchange insurance policy.
- 20 3. The method of claim 2 further including the step of  
  - storing the tracking code corresponding to the user ID.
- 25 4. The method of claim 2 wherein the step of issuing a tracking code includes the substep of  
issuing the tracking code with the policy requirements.
5. The method of claim 4 wherein the step of issuing the tracking code includes the step of  
encrypting the tracking code.
- 30 6. The method of claim 1 including the step of transmitting the premium cost to the user.
7. The method of claim 6 including the step of receiving from the user a confirmation to  
purchase the foreign exchange insurance policy.
- 35 8. The method of claim 1 wherein the policy requirements further include a specified currency, an

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- ° exchange rate, an amount of coverage, and a period of coverage, and wherein the determining step further includes the substep of
- determining the premium cost based on the policy requirements and the currency volatility.
- 5 9. The method of claim 1 wherein the step of accessing the data includes the substep of
- accessing historic exchange rates.
10. The method of claim 1 further including the steps of
- 10 accessing a period of coverage of the foreign exchange insurance policies, and
- determining whether the period of coverage has expired.
11. The method of claim 8 further including the step
- 15 of
- updating the status of the foreign exchange insurance policies having an expired coverage period.
12. The method of claim 1 wherein the step of receiving the policy requirement includes the substep of
- 20 receiving a credit card number as the user ID.
13. The method of claim 1 wherein the receiving step includes the substep of
- authenticating the identity of the user.
14. The method of claim 1 wherein the receiving step
- 25 includes the substeps of
- receiving encrypted user policy requirements,
- and
- decrypting the encrypted user policy requirements.
- 30 15. A method of processing a foreign currency transaction under a foreign exchange insurance policy comprising the steps, performed by a data processor, of:
- receiving transaction data including a user ID, a transaction amount, and a transaction date;
- 35 accessing a foreign exchange rate corresponding

- 30 -

- ° to the transaction date;  
accessing a policy exchange rate corresponding  
to the user ID;  
comparing the foreign exchange rate of the  
transaction date with the policy exchange rate; and  
5 determining the amount of insurance adjustment  
using the transaction data and the compared exchange  
rates.
16. The method of claim 15 including the step of  
verifying the validity of the user ID.
- 10 17. The method of claim 15 including the step of  
crediting a user's account by the amount of the determined  
insurance adjustment.
18. The method of claim 17 wherein the crediting  
step includes the substeps of  
15 accessing a remaining amount of coverage, and  
determining whether the remaining amount of  
coverage exceeds the transaction amount.
19. The method of claim 15 wherein the receiving  
step includes the substep of  
20 receiving the transaction data from an automatic  
teller machine.
20. The method of claim 15 wherein the receiving  
step includes the substep of  
receiving the transaction data from a bank  
25 terminal.
21. The method of claim 15 wherein the receiving  
step includes the substep of  
receiving the transaction data from a server on  
a computer network.
- 30 22. A method of processing a foreign currency credit  
card transaction under a foreign exchange insurance policy  
comprising the steps, performed by a data processor, of:  
receiving transaction data including a user ID,  
a credit card number, transaction amount, and a  
35 transaction date;



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- °                    verifying the validity of the credit card  
number; .  
                  accessing a foreign exchange rate corresponding  
to the transaction date;  
                  accessing a policy exchange rate corresponding  
5    to the user ID;  
                  comparing the foreign exchange rate of the  
transaction date with the policy exchange rate; and  
                  determining the amount of insurance adjustment  
using the transaction data and the compared exchange  
10    rates.  
23.                The method of claim 22 including the step of  
                  crediting a user's credit card account  
corresponding to the verified credit card number by the  
amount of insurance adjustment.  
15    24.                The method of claim 23 wherein the crediting  
step includes the substeps of  
                  accessing a remaining amount of coverage, and  
                  determining whether the remaining amount of  
coverage exceeds the transaction amount.  
20    25.                The method of claim 22 wherein the accessing  
step further includes the substep of  
                  accessing the foreign exchange rate from an  
external source separate from the data processor.  
26.                A method of controlling information transfer  
25    between a data processor and a central controller for a  
foreign exchange insurance policy comprising the steps,  
performed by the data processor, of:  
                  receiving from a user a transaction request;  
                  receiving from the user transaction data  
30    including a tracking number of the foreign exchange  
insurance policy;  
                  transmitting the transaction data to the central  
controller;  
                  receiving from the central controller  
35    instructions for processing the transaction request; and

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processing the transaction request according to the received instructions.

27. The method of claim 26 wherein the step of receiving transaction data includes the substep of receiving a user ID, a transaction amount, and a transaction date.

28. The method of claim 26 wherein the step of receiving instructions includes the substep of receiving an appropriate currency exchange rate under the foreign exchange insurance policy.

29. A method of controlling information transfer between an automatic teller machine (ATM) and a central controller for a foreign exchange insurance policy comprising the steps, performed by the ATM, of:  
receiving from a user a transaction request;  
receiving from the user transaction data including a tracking number of the foreign exchange insurance policy;  
transmitting the transaction data to the central controller;  
receiving from the central controller instructions for processing the transaction request; and  
processing the transaction request according to the received instructions.

30. The method of claim 29 wherein the step of receiving transaction data includes the substep of receiving a user ID, a transaction amount, and a transaction date.

31. The method of claim 29 wherein the step of receiving instructions includes the substep of receiving an appropriate currency exchange rate under the foreign exchange insurance policy.

32. A system for providing a foreign exchange insurance policy comprising:  
means for receiving from a user policy requirements for the foreign exchange insurance policy,

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- ° the policy requirements including a user ID;  
a database storing the policy requirements and  
the corresponding user ID;  
means for accessing data corresponding to the  
specified currency and current market conditions;  
5 means for estimating currency volatility from  
the accessed data; and  
means for determining a premium cost based on  
the currency volatility.
33. The system of claim 32 further including  
10 first issuing means for issuing a tracking code  
for the foreign exchange insurance policy.
34. The system of claim 33 wherein the database  
further stores the tracking code corresponding to the user  
id.
- 15 35. The system of claim 33 wherein the first issuing  
means includes  
second issuing means for issuing a tracking code  
with policy requirements.
36. The system of claim 35 wherein the first issuing  
20 means includes  
means for encrypting the tracking code.
37. The system of claim 32 further including means  
for transmitting the computed premium cost to the user.
38. The system of claim 37 further including means  
25 for receiving from the user a confirmation to purchase the  
foreign exchange insurance policy.
39. The system of claim 32 wherein the policy  
requirements further include a specified currency,  
exchange rate, amount of coverage, and a period of  
30 coverage, and wherein the determining means further  
includes  
means for determining the premium cost based on  
the policy requirements and the currency volatility.
40. The system of claim 32 wherein the accessing  
35 means further include

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means for accessing historic exchange rates.

41. The system of claim 32 further including means for accessing from the database the period of coverage of the foreign exchange insurance policies, and

5 means for determining whether the period of coverage has expired.

42. The system of claim 41 further including means for updating the status of the foreign exchange insurance policies having an expired coverage period.

43. The system of claim 32 wherein the receiving means includes

10 means for receiving a credit card number as the user ID.

44. The system of claim 32 wherein the receiving means includes

15 means for authenticating the identity of the user.

45. The system of claim 32 wherein the receiving means includes

20 means for receiving encrypted user policy requirements, and

means for decrypting the encrypted user policy requirements.

46. A system for processing a foreign currency transaction under a foreign exchange insurance policy comprising:

25 means for receiving transaction data including a user id, a transaction amount, and a transaction date;

first accessing means for accessing a foreign exchange rate corresponding to the transaction date;

30 second accessing means for accessing a policy exchange rate corresponding to the user ID;

means for comparing the foreign exchange rate of the transaction date with the policy exchange rate; and

35 means for determining the amount of appropriate insurance adjustment using the transaction data and the

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- ° compared exchange rates.
47. The system of claim 46 including means for verifying the validity of the user ID.
48. The system of claim 46 including means for crediting the user's account by the  
5 amount of insurance adjustment.
49. The system of claim 48 wherein the crediting means includes  
third accessing means for accessing a remaining  
amount of coverage, and  
10 means for determining whether the remaining amount of coverage exceeds the transaction amount.
50. The system of claim 46 wherein the receiving means receives the transaction data from an automatic teller machine.
- 15 51. The system of claim 46 wherein the receiving means receives the transaction data from a bank terminal.
52. The system of claim 46 wherein the receiving means receives the transaction data from a server on a computer network.
- 20 53. A system of processing a foreign currency credit card transaction under a foreign exchange insurance policy comprising:  
means for receiving transaction data including a user ID, a credit card number, a transaction amount, and a  
25 transaction date;  
means for verifying the validity of the credit card number;  
first accessing means for accessing a foreign exchange rate corresponding to the transaction date;  
30 second accessing means for accessing a policy exchange rate corresponding to the user ID;  
means for comparing the foreign exchange rate of the transaction date with the policy exchange rate; and  
means for determining the amount of insurance  
35 adjustment using the transaction data and the compared

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° exchange rates.

54. The system of claim 53 including means for crediting the user's credit card account corresponding to the verified credit card number by the amount of insurance adjustment.

5 55. The system of claim 54 wherein the crediting means includes

third accessing means for accessing a remaining amount of coverage, and

10 means for determining whether the remaining amount of coverage exceeds the transaction amount.

56. The system of claim 53 wherein the first accessing means includes

15 fourth accessing means for accessing the foreign exchange rate from an external source separate from the data processor.

57. A system for controlling information transfer between the system and a central controller for a foreign exchange insurance policy comprising:

20 first receiving means for receiving from a user a transaction request;

second receiving means for receiving from the user transaction data including a tracking number of the foreign exchange insurance policy;

25 means for transmitting the transaction data to the central controller;

third receiving means for receiving from the central controller instructions for processing the transaction request; and

30 means for processing the transaction request according to the received instructions.

58. The system of claim 57 wherein the second receiving means includes

fourth receiving means for receiving a user ID, a transaction amount, and a transaction date.

35 59. The system of claim 57 wherein the third

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- receiving means includes  
fifth receiving means for receiving an appropriate currency exchange rate under the foreign exchange insurance policy.
60. An automatic teller machine (ATM) for  
5 controlling information transfer between the ATM and a central controller for a foreign exchange insurance policy comprising:  
first receiving means for receiving from a user a transaction request;  
10 second receiving means for receiving from the user transaction data including a tracking number of the foreign exchange insurance policy;  
means for transmitting the transaction data to the central controller;  
15 third receiving means for receiving from the central controller instructions for processing the transaction request; and  
means for processing the transaction request according to the received instructions.
- 20 61. The system of claim 60 wherein the second receiving means includes  
fourth receiving means for receiving a user ID, a transaction amount, and a transaction date.
- 25 62. The system of claim 60 wherein the third receiving means includes  
fifth receiving means for receiving an appropriate currency exchange rate under the foreign exchange insurance policy.
63. A computer-readable medium for providing a  
30 foreign exchange insurance policy comprising:  
means for causing a data processor to receive from a user policy requirements for the foreign exchange insurance policy, the policy requirements including a user ID;  
35 means for causing a database to store the policy

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- ° requirements and the corresponding user ID;  
means for causing a data processor to access  
data corresponding to the specified currency and current  
market conditions;  
means for causing a data processor to estimate  
5 currency volatility from the accessed data; and  
means for causing a data processor to determine  
a premium cost based on the currency volatility.  
64. An article of manufacture capable of configuring  
a data processor to perform a method of providing a  
10 foreign exchange insurance policy comprising the steps of:  
receiving from a user policy requirements for  
the foreign exchange insurance policy, the policy  
requirements including a user ID;  
storing the policy requirements and the  
15 corresponding user ID;  
accessing data corresponding to the specified  
currency and current market conditions;  
estimating currency volatility from the accessed  
data; and  
20 determining a premium cost based on the currency  
volatility.

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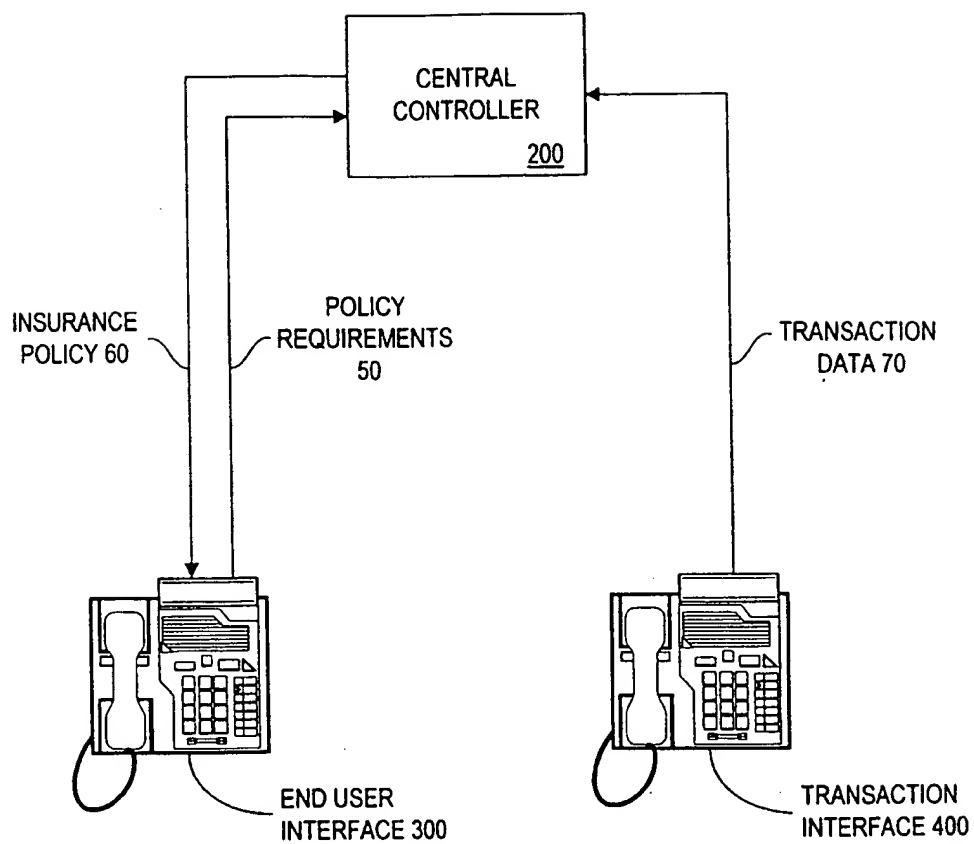


FIG. 1

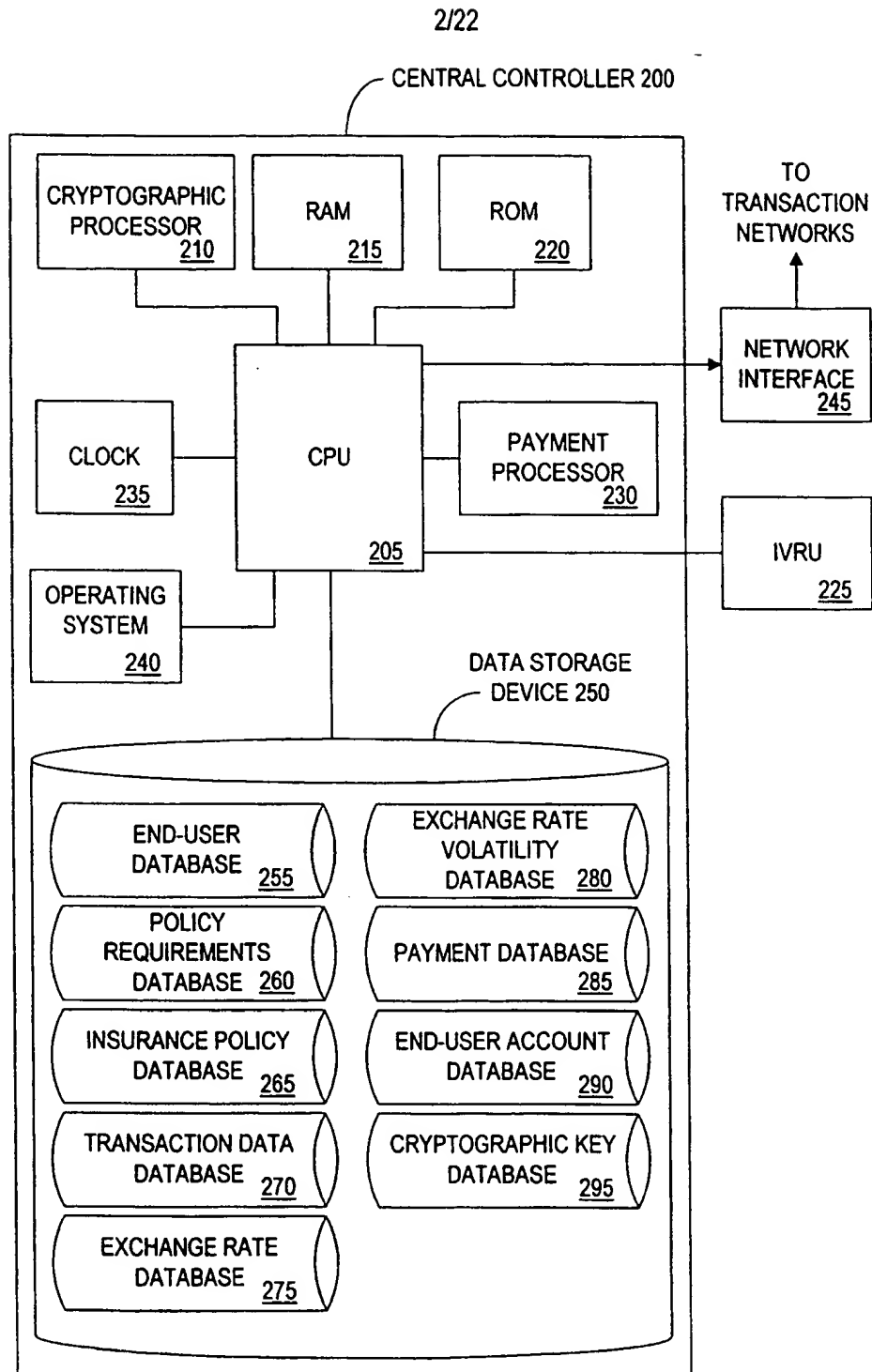


FIG. 2

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POLICY REQUIREMENTS  
DATABASE 260

END USER ID NUMBER	CREDIT CARD NUMBER	CURRENCY	EXCHANGE RATE	START DATE	END DATE	AMOUNT OF COVERAGE	TRACKING NUMBER
GB45921	1245-4056-3240-2113	FRENCH FRANC	5.0	05/07/97	05/12/97	\$2,000	3819B
HT21990	3457-8854-2114-9191	GERMAN MARK	1.5	09/01/97	09/26/97	\$1,500	9233C
DL44087	3501-2224-6902-8787	GERMAN MARK	1.6	11/02/97	11/03/97	\$4,200	8115J

FIG. 2A


INSURANCE POLICY  
DATABASE 265



END USER ID NUMBER	INSURANCE POLICY TRACKING NUMBER	DATE GENERATED	POLICY REQUIREMENTS TRACKING NUMBER	STATUS
GB45921	75HK64	02/05/97	3819B	ACTIVE
HT21990	45SF19	02/14/97	9233C	PENDING
DL44087	26VK39	03/16/97	8115J	EXPIRED

FIG. 2B

TRANSACTION DATA  
DATABASE 270



INSURANCE POLICY TRACKING NUMBER	END USER ID NUMBER	AMOUNT OF TRANSACTION	DATE OF TRANSACTION	PREVAILING EXCHANGE RATE	BANK ID NUMBER
75HK64	GB45921	\$200	05/09/97	4.5	34MG
45SF19	HT21990	\$350	09/06/97	1.45	18FD
26VK39	DL44087	\$500	11/03/97	1.62	78RR

FIG. 2C

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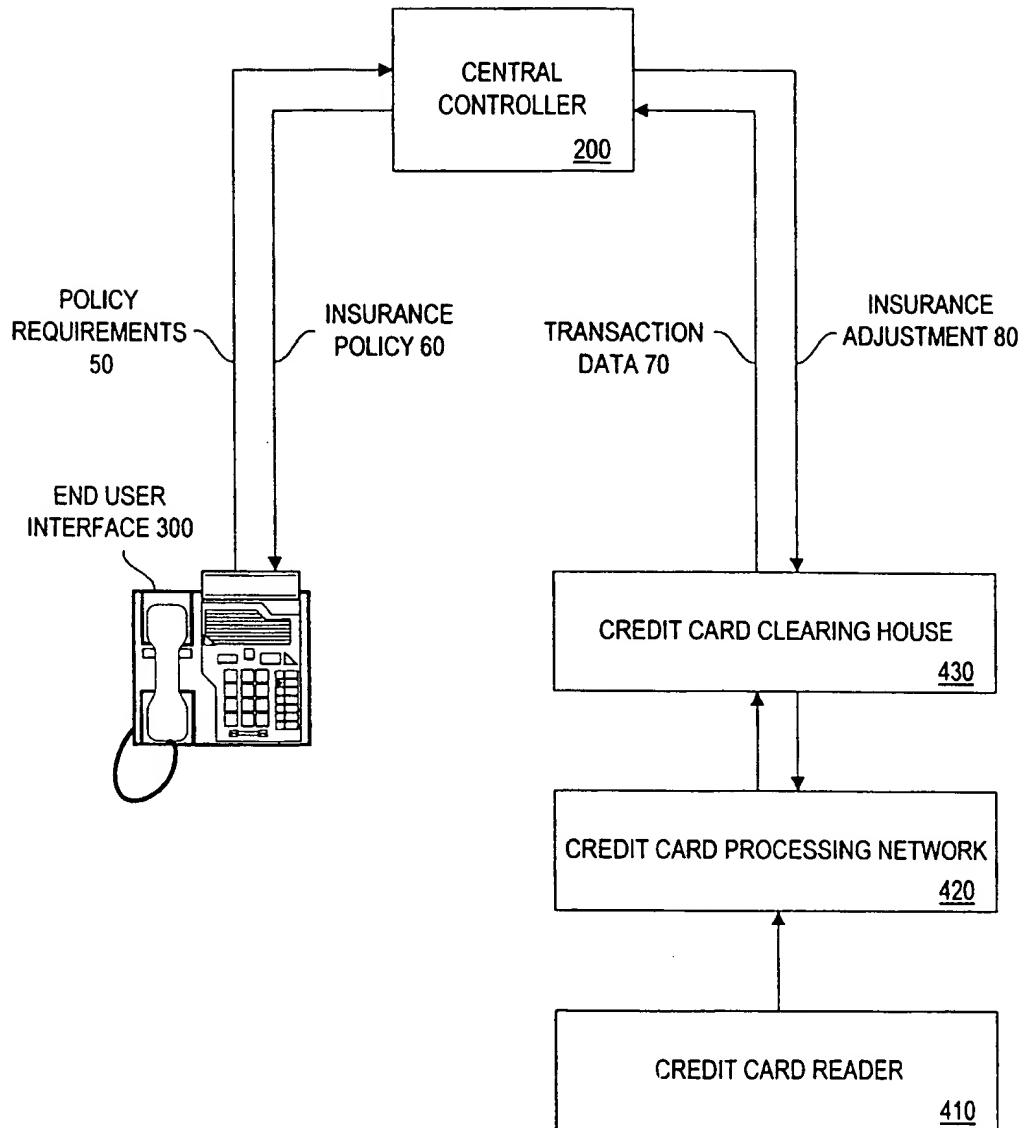


FIG. 3

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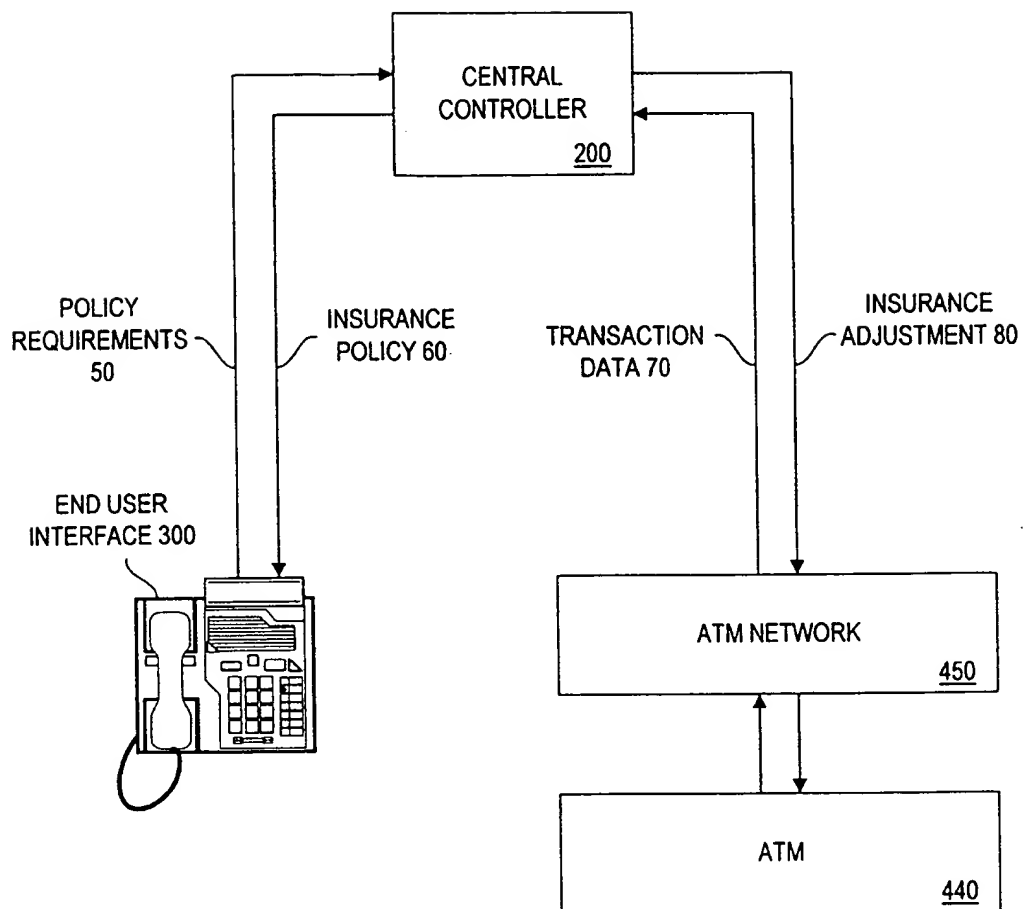


FIG. 4

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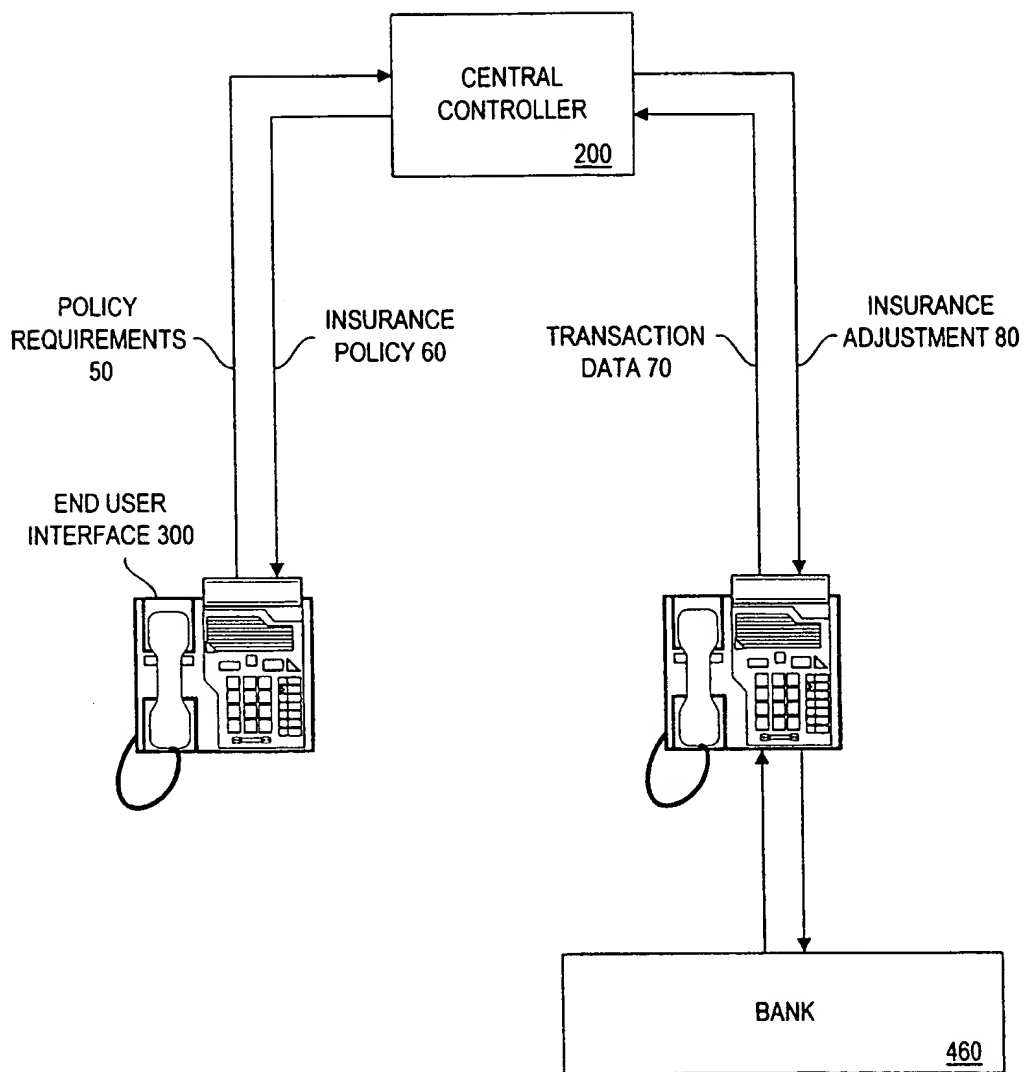


FIG. 5



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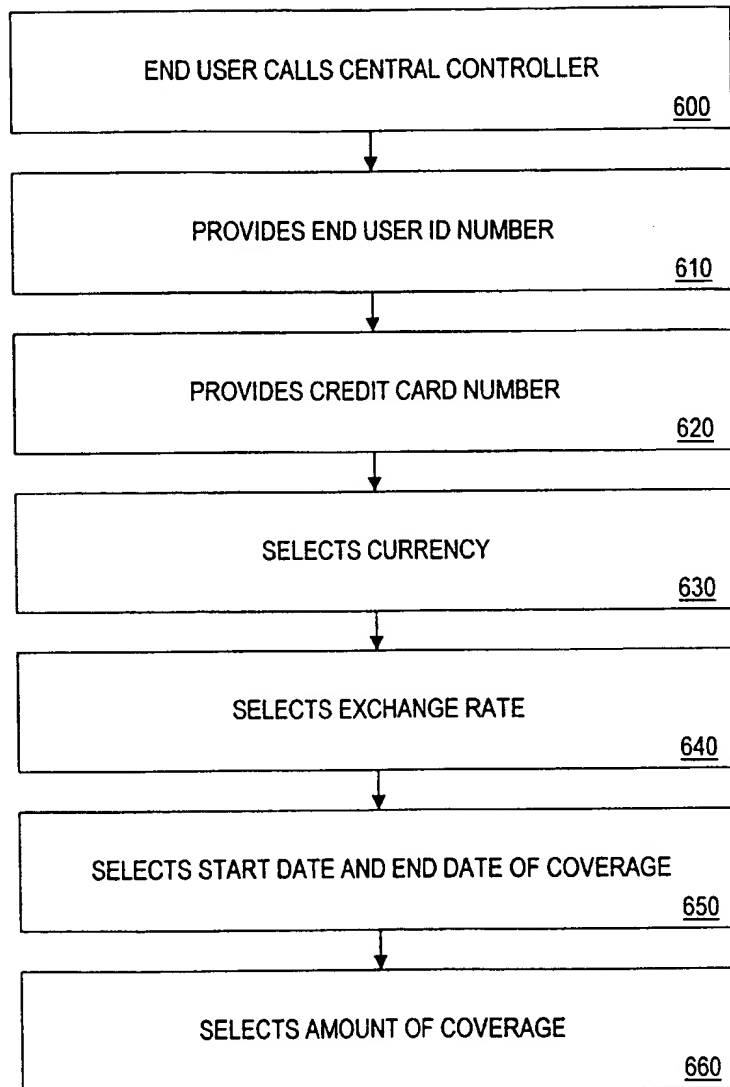


FIG. 6

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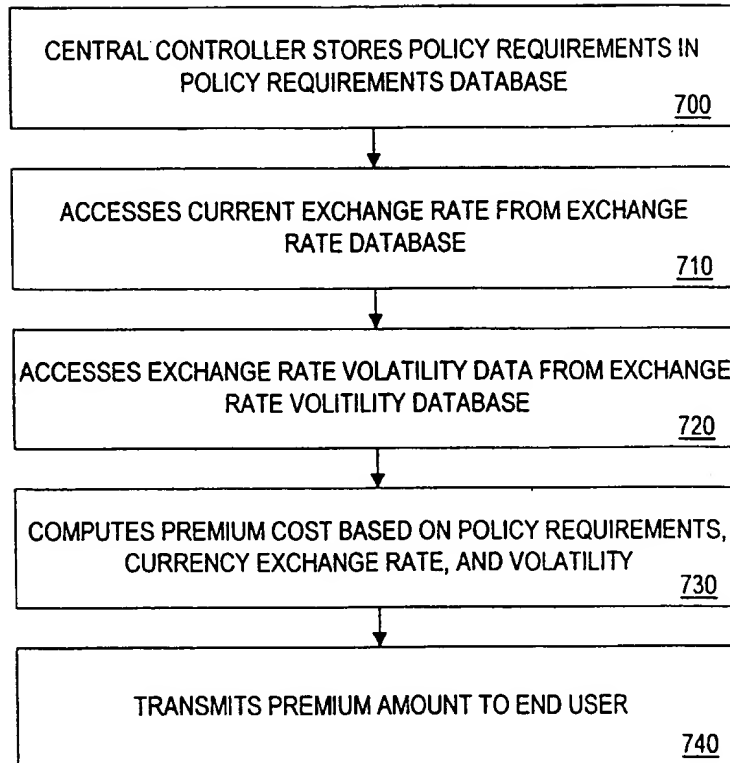


FIG. 7

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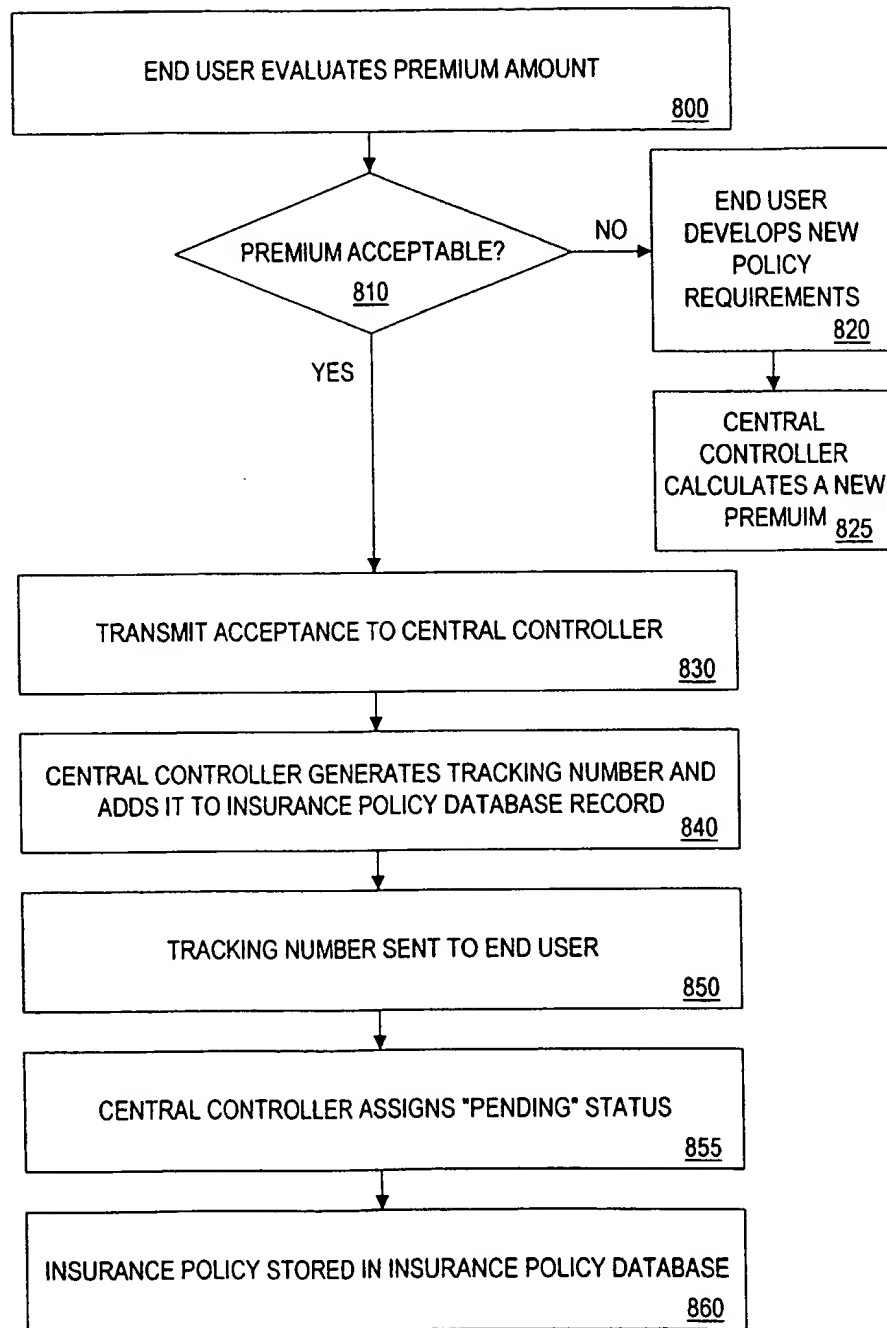


FIG. 8

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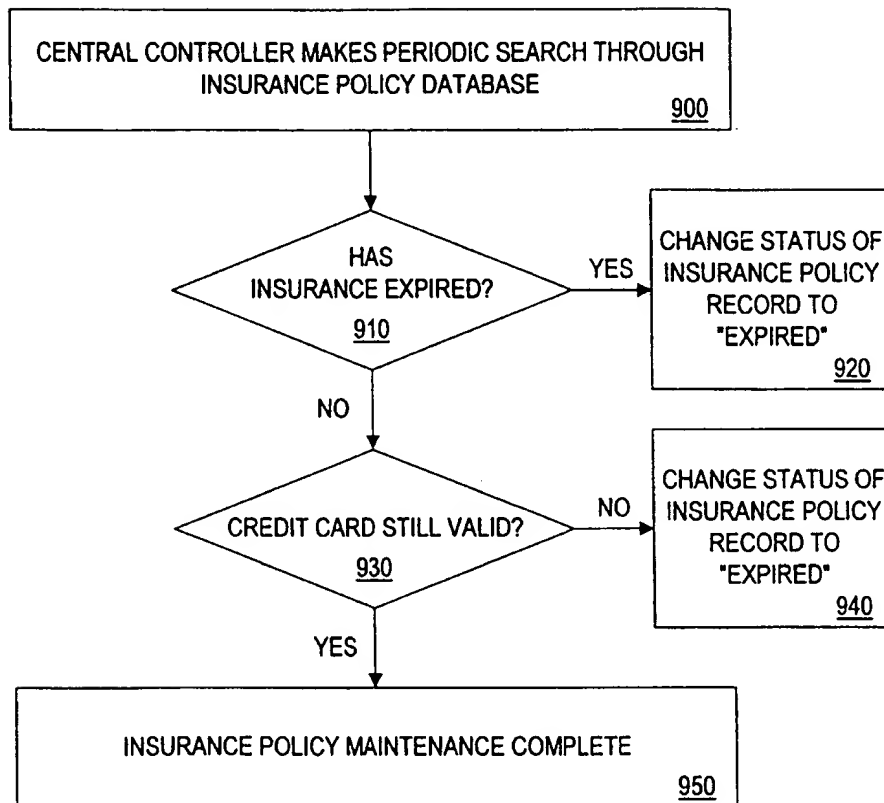


FIG. 9

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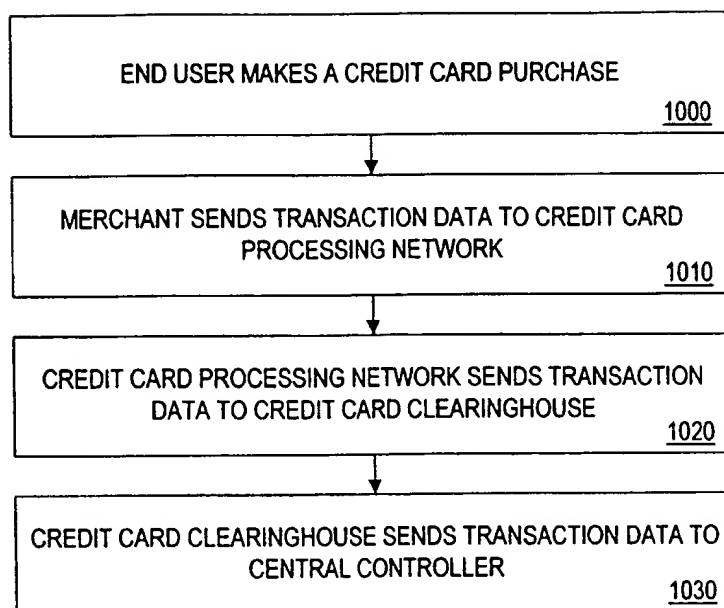


FIG. 10

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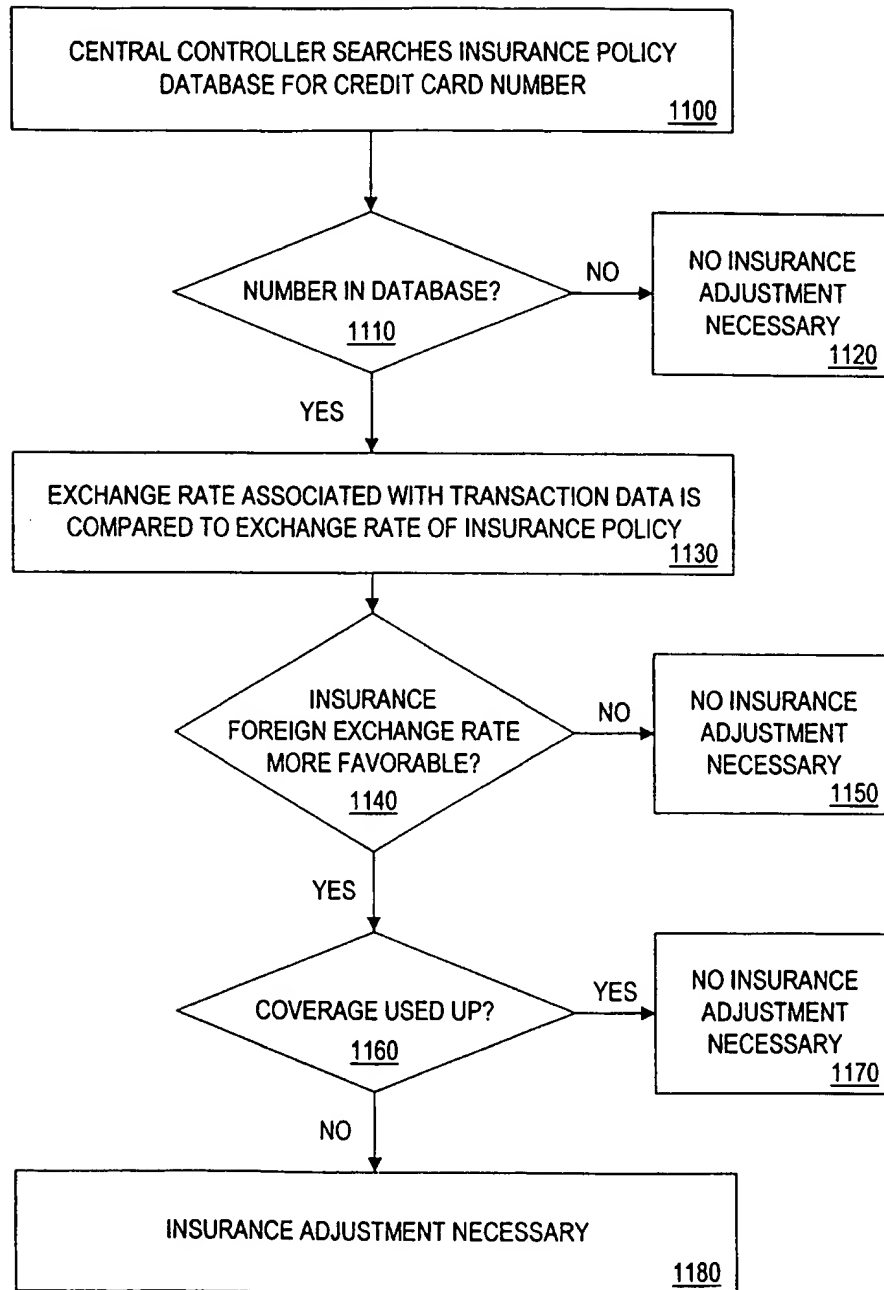


FIG. 11

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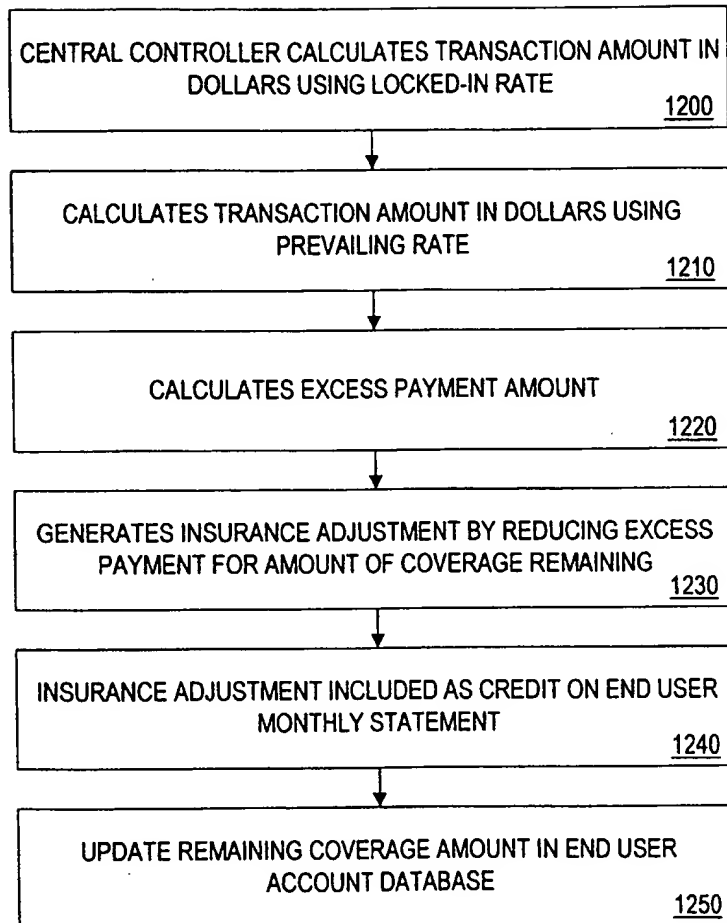


FIG. 12

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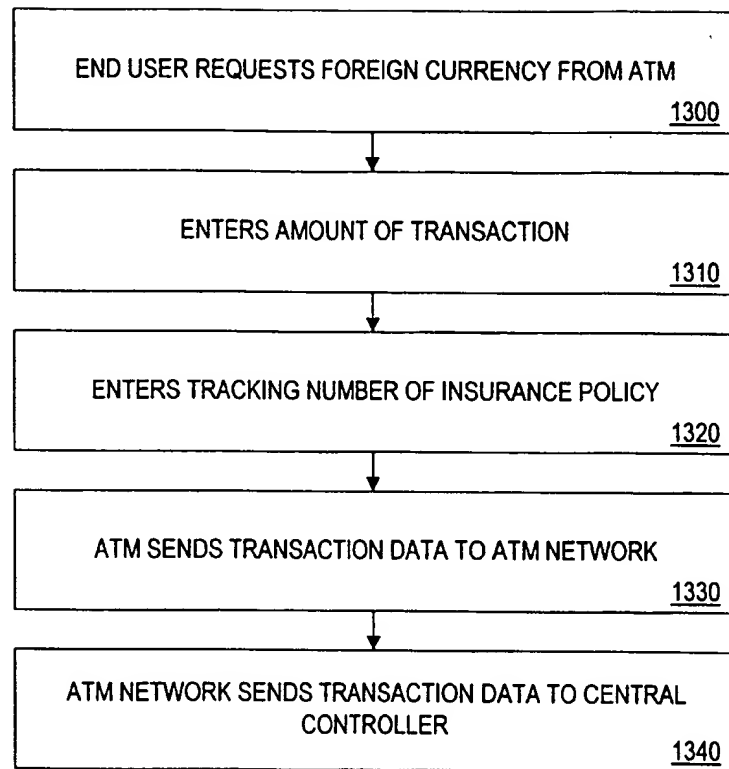


FIG. 13



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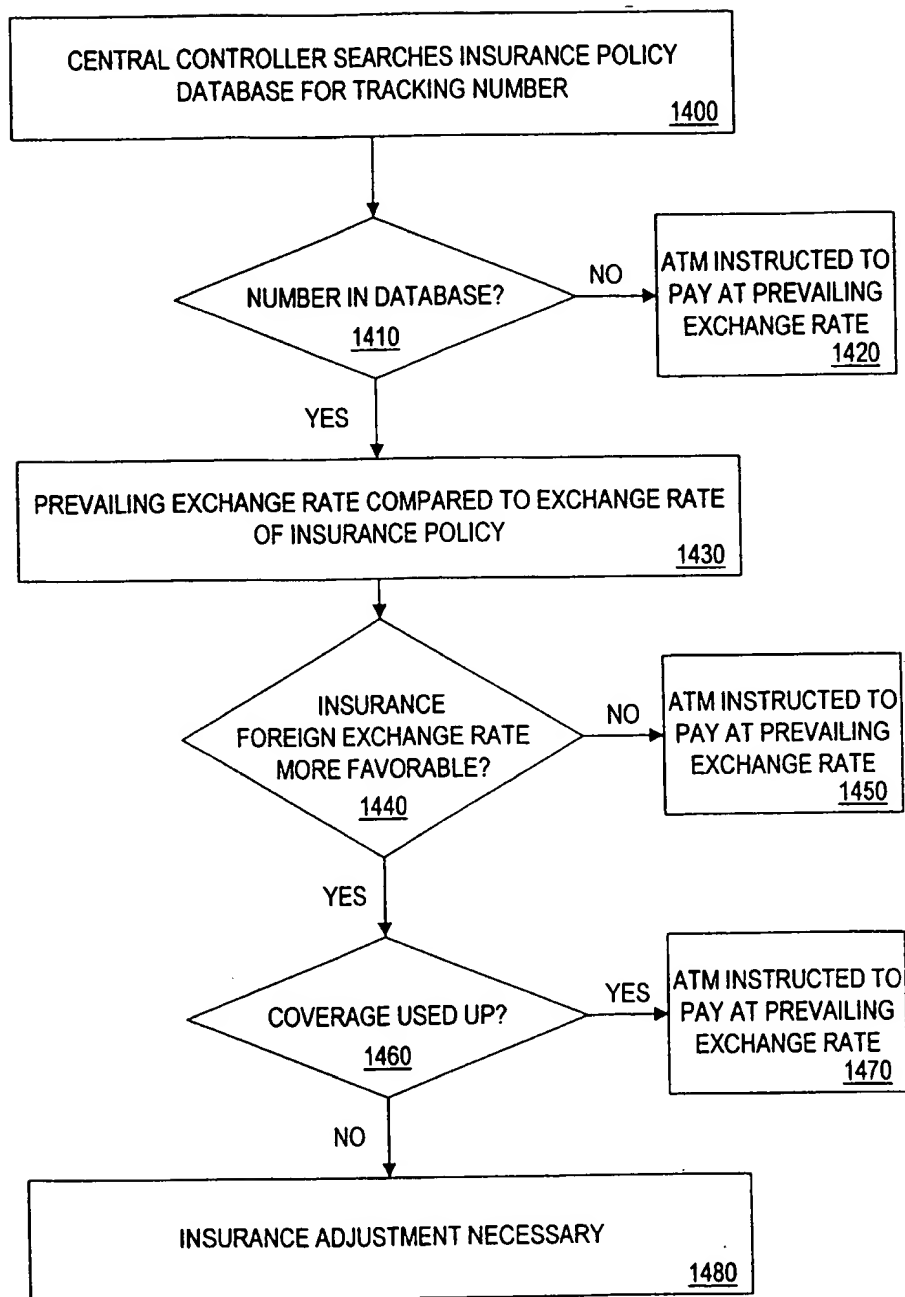


FIG. 14

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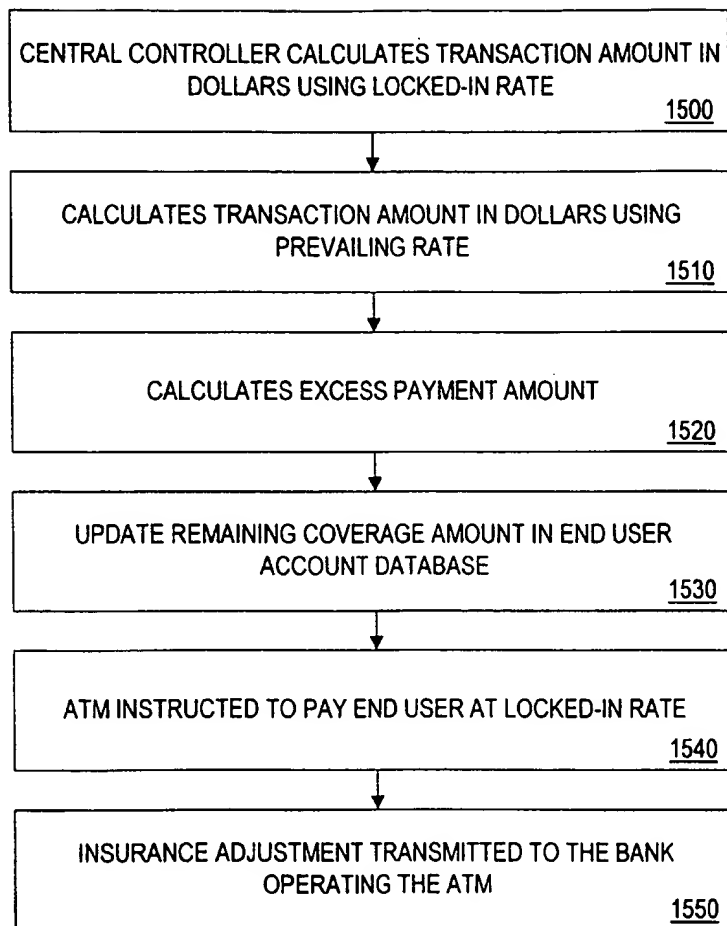


FIG. 15

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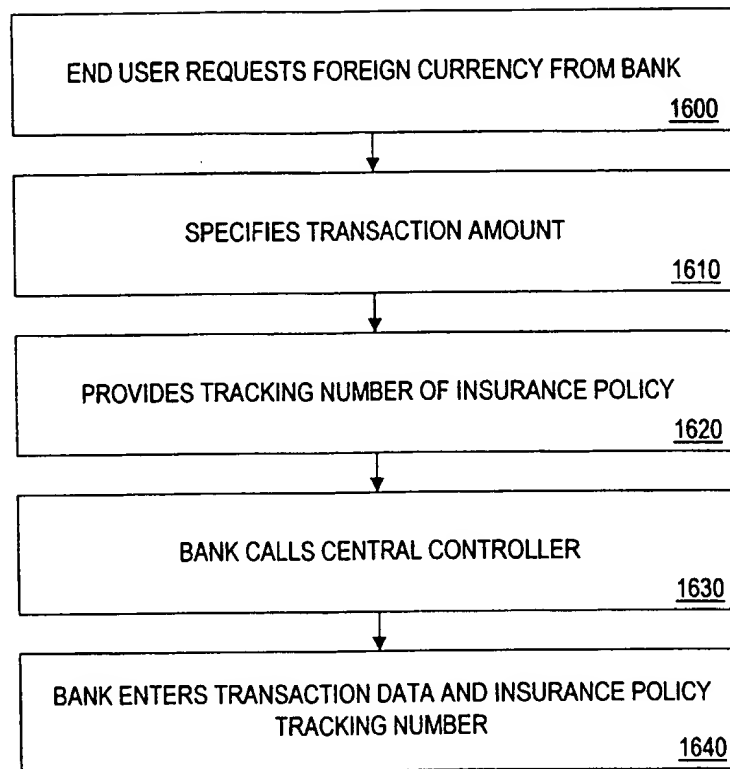


FIG. 16

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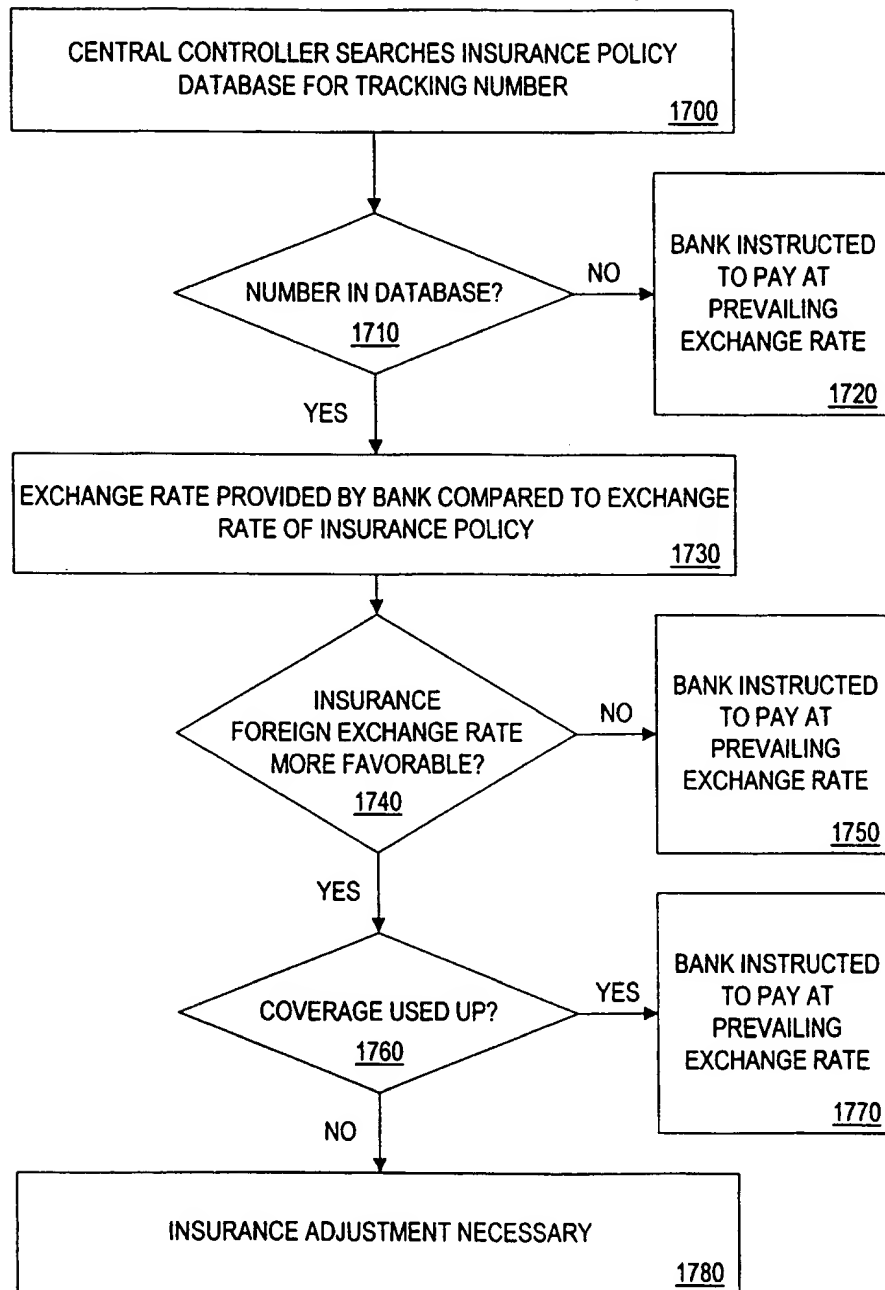


FIG. 17

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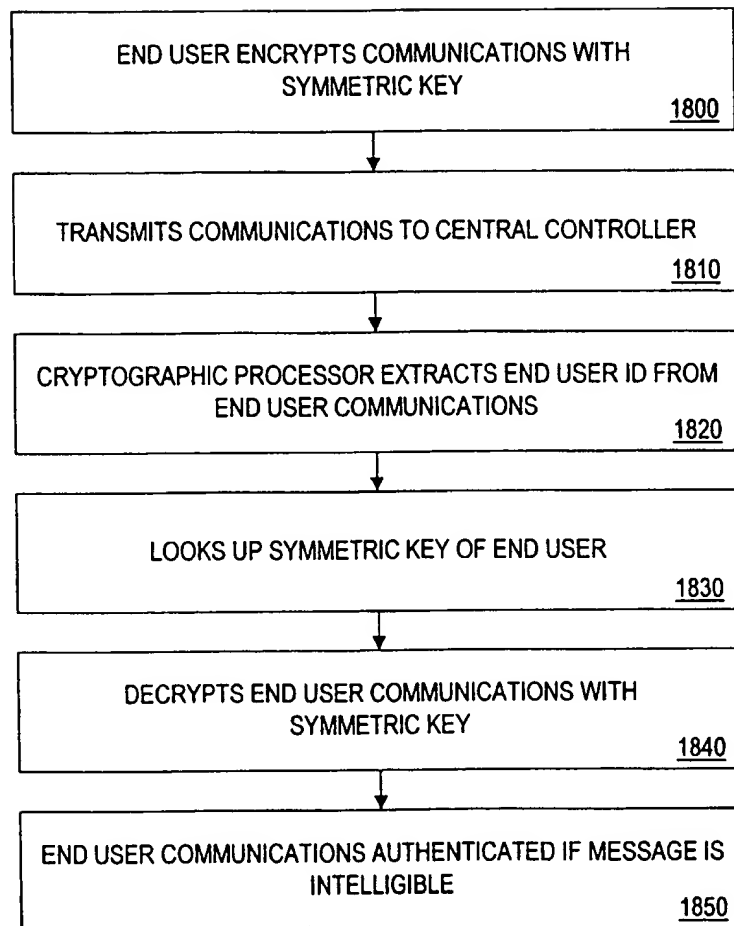


FIG. 18

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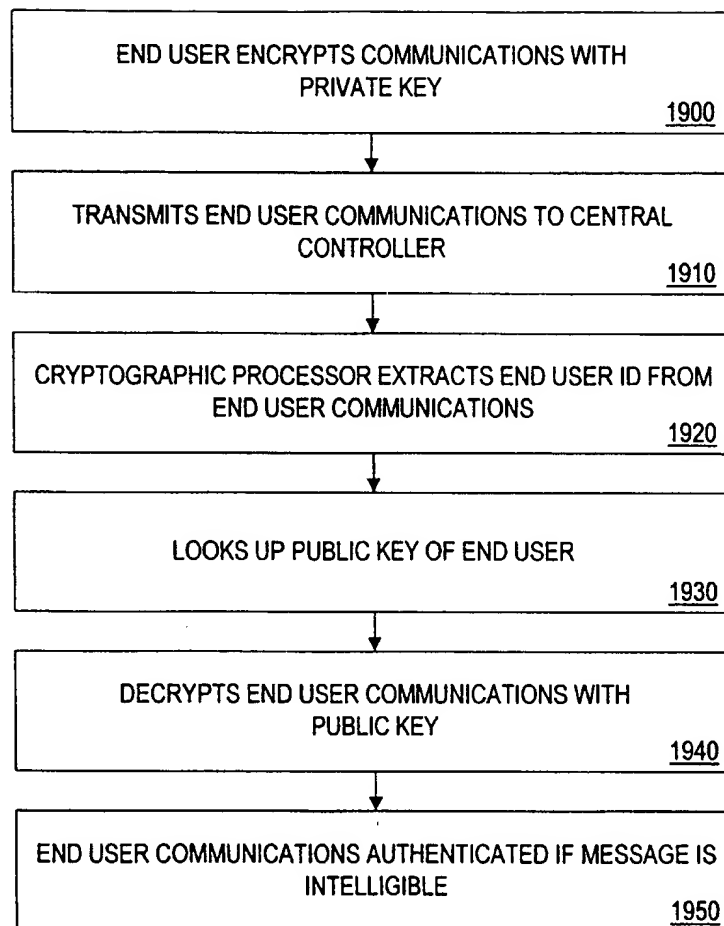


FIG. 19

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/20754

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) :G06F 17/60

US CL :705/35; 235/379; 364/400; 705/1; 707/104

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 235/375,379,380,381; 364/400; 380/9,23,24; 705/1,4,16,17,18,24,35,38,39,44; 707/104

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,446,885 A (MOORE et al) 29 August 1995, see abstract.	1-63
A,P	US 5,630,127 A (MOORE et al) 13 May 1997, see abstract.	1-63
A,E	US 5,704,045 A (KING et al) 30 December 1997, see abstract.	1-63

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*B* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

30 JANUARY 1998

Date of mailing of the international search report

09 MAR 1998

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